

REMARKS/ARGUMENTS

Claims 1 - 5, 8 - 11, 14, 17 - 22, 24, 25, 27, and 28 are pending.

An objection was raised as to claims 18 - 33 for being mis-numbered. Claims 18 - 33 have been renumbered as claims 17 - 32; dependent claims have been amended accordingly. Claim references are made with respect to the re-numbered claims.

Claims 1 - 32 stand rejected under 35 U.S.C. Section 103 for being obvious in view of Sicola et al., U.S. Pat. No. 6,629,264 and a reference entitled "RTP: A Transport Protocol for Real-Time Applications," RFC 1889.

The present invention relates to data replication in storage systems. As recited in claim 1, for example, the storage system includes "a first storage component comprising a first disk system, the first disk system comprising a first disk control unit and one or more first disk units [and] a second storage component comprising a plurality of second disk systems, each second disk system comprising a second disk control units and one or more second disk units." Data written to the first disk system is transmitted to each of the second disk systems as data packets, along with a "time stamp, and a sequence number." This aspect of the invention is illustrated in Fig. 4 and discussed in the specification beginning on page 12, line 19; kindly see also the top of page 13. Each of the second disk systems is configured to:

- (1) "receive data packets from the first disk system";
- (2) "to receive a limit time value from a predetermined one of the second disk systems based on time stamps and sequence numbers";
- (3) "select a candidate data packet from among its received data packets by comparing their associated time stamps to the limit time value"; and
- (4) "write the candidate data packet on one of its second disk units."

Sicola et al. teach a data replication system that "employs the grouping of logical units into 'association sets', for logging and failover purposes." *Abstract*. See generally, column 19, line 58 to column 20, line 37. In particular, Sicola et al. teach that "[a]ll members of an association set must be on the same controller to enforce cache coherency. When members are

added to an association set, they are moved to reside on the same controller, and will failover together.” *Col. 20, lines 31 - 37.*

The present invention recites that each of the second disk systems [receives] data packets from the first disk system. *Claim 1.* The present invention allows data written to the first disk system to be replicated among multiple second disk systems, where each second disk system has its own controller. The multiple second disk systems of the present invention are not anticipated by the “association set” used by the data replication system of Sicola et al. because the association set requires its members to “be on the same controller,” which is clearly not the case with the multiple second disk systems recited in claim 1 of the present invention.

The abstract in the RFC 1889 reference was cited for teaching “time stamp and sequence number.” Section 6.3.1 in the RFC 1889 reference was also cited for teaching “limit time.” Sicola et al. do not disclose either aspect of the present invention. RFC 1889 describes a real-time transport protocol (RTP) that “provides end-to-end network transport functions suitable for applications transmitting real-time data.” *Abstract.* Like any communication protocol, RTP is a protocol for delivering data between two machines. However, the RTP protocol does not specify or otherwise suggest that the data might be processed within a receiving machine in a manner as recited in the pending claims.

For example, an aspect of the invention is that each second disk system [receives] a limit time value from a predetermined one of the second disk systems, where the limit time value is used in a second disk system to select a candidate data packet from among its received data packets. First, it is earnestly submitted that Section 6.3.1 of RFC 1889 does not suggest a limit time value that is used to select a candidate data packet. With all respect, it is earnestly submitted that it is not at all clear how Section 6.3.1 of RFC 1889 shows a limit time value, as asserted in paragraph 2 of the Office action. Sicola et al. teaches the use of a ‘heartbeat’ timer at column 9, lines 55 - 67 to send an “echo” to extend link service; i.e., to maintain the link. The Sicola et al. ‘heartbeat’ timer does not teach or suggest the recited limit time value used to select a candidate data packet.

Second, though the RTP protocol incorporates a sequence number and a timestamp (Section 5.1 in RFC 1889), there is no teaching or suggestion in RFC 1889 (or in

Appl. No. 09/607,807
Amdt. sent May 6, 2004
Reply to Office Action of February 6, 2004

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Sicola et al., for that matter) that the sequence number and the timestamp from the RTP protocol can be used to determine a limit time value (claim 1: a limit time value ... based on time stamps and sequence numbers).

For at least any one of the foregoing reasons set forth the pending claims as amended are believed to patentably distinct from the cited art.

CONCLUSION

In view of the foregoing, all claims now pending in this Application are believed to be in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 650-326-2400.

Respectfully submitted,



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